DIN rail mathematical unit MP03

❑ **isolated (1,5 kV / 1 min)**   ❑ **galvanic isolation**   ❑ **square root**

INPUT SIGNALS

User selectable – 1st channel		
CURRENT	0 – 20 mA DC	
	4 – 20 mA DC	
VOLTAGE	0 – 10 V DC	
Preset by manufacturer – 2nd channel*		
CURRENT	0 – 20 mA DC	
	4 – 20 mA DC	
VOLTAGE	0 – 10 V DC	

OUTPUT SIGNALS
ISOLATED

User selectable		
CURRENT	0 – 20 mA DC	
	4 – 20 mA DC	
due to wirring	active / passive	
VOLTAGE	0 – 10 V DC	

TECHNICAL DATA

|	
POWER SUPPLY	24 VAC , DC : -15% / +20%
CONSUPTION	max. 2 W – device is protected by reversible fuse
Exc.power supply	22V @ 0mA , 19V @ 23mA
INPUT RESISTANCE	current input : 50 Ω (input resistor) + 25 Ω (protection posistor PTC)
	voltage input : 100 kΩ
MATHEMATICAL OPERATION	adding , subtraction (0 - 100% signal weight selection)
	averaging (50% weight of each input signal)
	square root (on 1st channel input signal)
MAXIMAL INPUTS OVERLOAD	current : 100 mA continous , 160 mA @ 1minute
	voltage : 48 VDC continous
	48 VDC on terminal strip 3
DIGITAL RESOLUTION	analogue input : 20 bits
	analogue output : 14 bits
SIGNAL RESPONSE	from 0 to 100 % : 300 msec without filters
ACCURACY	+/- 0,1 % from full range
TEMP.COEFFIC.	0,005 % from full range / °C
ISOLATION STRENGTH	testing volatge : 1500 V DC / 1 min *input vs. output ; power supply vs.input, output*
	working voltage : 120 V DC *input vs. output ; power supply vs.input, output*
ANALO.OUTPUT	0-20 mA, 4-20 mA and 0-10 V
OUTPUT IMPEDANCE	current output : max. 600 Ω
	voltage output : min. 5 kΩ
MAX. OUTPUT OVERLOAD	current : unlimited *(short-circuit resistant)*
	voltage : unlimited *(short-circuit resistant)*
CALIBRATION	valid for one year
MOUNTING	Plastic DIN rail box – 17,5 mm module
DIMMENSIONS	17.5 x 90 x 60 mm (W x H x D)
ENCLOSURE	IP20
WIRRING CONNECTION	terminal strip *max. conductor cross-section is 2,5mm*
WEIGHT	69 grams
STABILISATION	5 minutes
OPERATING TEMPERATURE	- 10 °C / +50 °C
OPERATION	continuos
SITE ALTITUDE	max. 2000 metres above the sea level
EMC radiation	ČSN EN 61326-1 article 7 (2006)
	ČSN EN 55011/A1/A2, article 5.2, table 3, article 16 (bellow limit for group 1, class. B)
EMC immunity influence	max. +/- 0,1% from full signal with unshielded wires
APPLICATION	exclusively intended for industrial or professional use

MP03 series mathematical units for above specified industry signals are used for arithmetical operations between two input signals. Weight ratio and zero offset could be set for each input signal before arithmetical operation. Available arithmetical operations are: **adding, subtracting** and **averaging**. For specific flow measuring is **square root** function available.

FUNCTIONS

- ❑ **ADDING, SUBTRACTING and AVERAGING** input signals
- ❑ **SQUARE ROOT**
- ❑ **ADJUSTABLE WEIGHT RATIO** of input signals
- ❑ **ZERO OFFSET** of input signals
- ❑ **SMALL SIZE 17,5 x 90 x 60 mm**
- ❑ **INPUT and OUTPUT SIGNAL SELECTION** by user
  - ▪ By PC (using comm.cable and SW MERCOS®)
  - ▪ Due terminal strip wirring – active or passive current output
- ❑ **INPUT SIGNAL SENSOR MALFUNCTION** signalisation
  - ▪ Only for 4-20 mA current loops on both input channels
- ❑ **INPUT SIGNALS FILTRATION**
- ❑ **EXCITATION POWER SUPPLY**
  - ▪ For one channel only
- ❑ **GALVANIC ISOLATION**
  - ▪ Input signals from output signal
  - ▪ Input signals & output signal from power supply
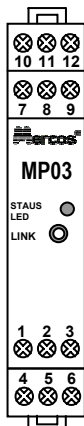 - ▪ Output signal & power supply from exc.supply
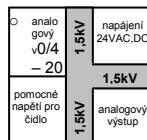
DESCRIPTION

Matematical unit MP03 works with all input and output signals in their full range. MP03 configuration is performed by communication software NP01_A over PC. For PC configuration is communication cable PS 01 (serial) or PU 01 (USB) needed, which galvanically isolate PC from MP 03 converter.

Configuration software NP01_M allows:
- ▪ 1st channel input signal type
- ▪ 2nd channel input signal type *
- ▪ output signal type
- ▪ signal weight ratio for both channels
- ▪ zero offset for each channel
- ▪ arithmetical operation (adding, subtracting, averaging)
- ▪ mathematical operation (square root)
- ▪ input signal sensor malfunction (4-20mA , for both channels)
- ▪ signal filtration selection

*) 2nd channel input signal type is preseted by manufacturer, so it is neccessary to specify signal type (current / voltage) in order code. If current signal type is specifie,d user can choose between 0-20mA and 4-20mA.

NOTICE
❑ **Attention**
- ▪ Excitation power supply for sensors is galvanically connected with input signals

mercos®
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Boleslavova 989/4 , 709 00, Ostrava 9
Czech Repulic

tel/fax 596 627 097, mob. 602 800 007
mercos@mercos.cz , www.mercos.cz

MP03 converter TERMINAL STRIP

LEGEND

- **strips 1 – 4** ………………………………… analogové vstupy
  - strip 1, 2 voltage / current – channel 1
  - strip 1, 3 current – channel 2
  - strip 1, 3 voltage – channel 2
  - strip 1, 4 voltage – channel 1
- **strip 6** ……..…………………….. zdroj pomocného napětí (PN)
  - 19V @ 23 mA
- **strip 7 – 9, 12** ……………………………. analogové výstupy
  - current active
  - voltage passive
  - voltage
- **strips 10 – 11** ……………….…….…… MP03 power supply
  - 24 VAC or 24 VDC (polarity is not important)

LEGEND
- **LINK** ……………. communication socket for PC connection

INPUT SIGNALS WIRRINGS for MP03

CURRENT INPUT

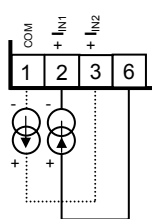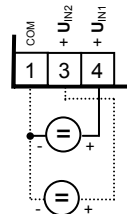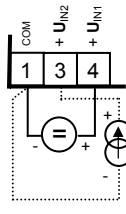| ACTIVE SENS.		ACTIVE and PASSIVE SENSOR
2x two wires ▪ 0/4 – 20 mA ▪ 0/4 – 20 mA	1x free wires ▪ 0/4 – 20 mA ▪ supply from MP03 1x two wires ▪ 0/4 – 20 mA	1x two wires passive ▪ 0/4 – 20 mA 1x two wires active ▪ 0/4 – 20 mA
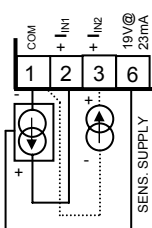
VOLTAGE INPUT   VOLT./CURR. INPUT

ACTIVE SENS.

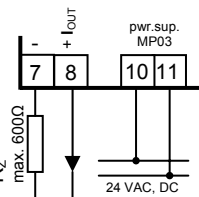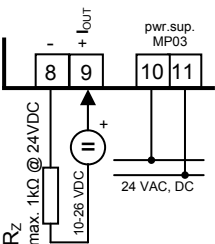| VOLTAGE INPUT	VOLT./CURR. INPUT
2x two wires ▪ 0 – 10 VDC ▪ 0 – 10 VDC	2x two wires ▪ 0 – 10 VDC – 1st channel ▪ 0/4 – 20 mA – 2nd channel

OUTPUT SIGNALS WIRRINGS for MP03

CURRENT OUTPUT   VOLTAGE OUTPUT

current active	current passive	voltage active
▪ 0/4 – 20 mA MP03 generates current	▪ 4 – 20 mA MP03 is current hole	▪ 0 – 10 V DC MP03 generates voltage
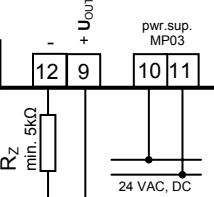
ORDER CODE

MP 03 . A

A	**2nd channel signal type**	I – current
		U – voltage
B	**input 1st channel**	1 – 0 .. 20 mA
		2 – 4 .. 20 mA
		3 – 0 .. 10 V
C	**Input 2nd channel**	1 – 0 .. 20 mA
		2 – 4 .. 20 mA
		3 – 0 .. 10 V
D	**output**	1 – 0 .. 20 mA
		2 – 4 .. 20 mA
		3 – 0 .. 10 V
E	**operation**	1 – adding
		2 – subtracting
		3 – averaging
		4 – square root

A – order code mandatory parameter
B to E – are optionals parameters. These settings are available in NP01_M communication software.

MP03 SETTINGS

Setting via communication software

ATTENTION: communication socket (LINK) has the potential of input terminal strips. Galvanic isolation of communication is realized by communication cable PU 01 (PS 01)

To setup PP03 converter communication software NP01_M and MERCOS® cable link PS 01 (RS232) or PU 01 (USB) is needed. Actual version of NP01_M communication software is free to download from our webpage: http://www.mercos.eu , where you can also find addtional informations.

LED diode STATUS
The status LED diode is situated in the middle of the front panel. It has red color and informs user about actual MP03 status.

STATUS LED	
Continous light	Measuring mode
Fast blinking (ten times a second)	MP03 malfunction, please contact manufacturer.

ORDER EXAMPLE

MP 03 – I
- if not specified in order, MP03 is set:
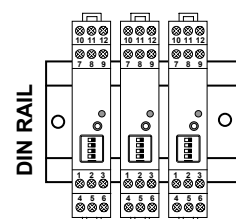1st channel: **4 - 20 mA**
2nd channel: **4 - 20 mA**
Analogue output: **4 - 20 mA**
mathematical operation : **adding**
zero offset for both channels is: **0%**
signal weight is: **50% : 50%**

MOUNTING EXAMPLE

- **RECOMMENDATION:**
  - We recommned to mount MP03 on DIN rail vertically with inputs down.
  - In case that operational temperature is expected to be higher than 40°C , we recommned to mount MP03s on DIN rail with 5mm space.